

# SEAT TECHNOLOGY

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## CROSS-REFERENCE TO RELATED APPLICATIONS, IF ANY

10 This application claims the benefit under 35 U.S.C. §119(e) of co-pending  
US Provisional Patent Application Serial No. 60/444,330, filed January 30, 2003,  
which is hereby incorporated by reference.

## STATEMENT REGARDING FEDERALLY SPONSORED

15 RESEARCH OR DEVELOPMENT

Not applicable.

20 REFERENCE TO A MICROFICHE APPENDIX, IF ANY

Not applicable.

## BACKGROUND

### 5           1.     Field.

The invention relates seats, more particularly seats for bicycles, motorcycles, snowmobiles and stationary bicycles, and most specifically seats using electronic power source(s) to activate saddle vibration, oscillation, rolling, kneading, percussion, compression therapeutic massage replicated actions, or with  
10   heating, cooling, electronic cancellation of “vibration when in excess” as programmed functional options for actions of the seat/saddle while the bicycle or motorcycle is used.

### 2.     Background Information.

15           Present bicycle seats consist of half of a concave clamshell made of a hard plastic or composite infrastructure. Foam, gel or other is used as padding and is covered by leather or vinyl pulled over outside surface of plastic shell and secured on the underside lip of shell with permanent cement and/or staples around the entire plastic shell seat infrastructure. Inside of the shell is a concave area formed  
20   by the plastic shell with two ¼ inch to 1/8 inch metal rods running 95% of the length, (front to back) within the concave shell. The rods are both infrastructure support and standardized in specifications to allow attachment by clamping of seat rods to standard dimension seat posts of bicycle. Configuration applies to bicycles

and their seats designed for recreational, anatomically correct, gender specific, comfort, mountain, hybrid, touring, tandem and racing.

5 Present motorcycle seats/saddles consist of a flat (approximately  $\frac{1}{4}$  inch thick) plastic or composite basepan (tailored to fit and is attached to the motorcycle frame) with foam, gel or other material covering basepan shape or configuration, thus providing padding to be covered by leather, vinyl or other material which is sat on while riding.

10 Review of prior art confirms that accepted seat/saddle designs and configurations to date deal only with mechanical and material elements to address the comfort/discomfort issues of sitting on the seat/saddle for varying periods of time while riding. Varying degrees of soreness/numbness from mild to severe at the crotch, perineum and associated bones/muscles at sitting haunches can be such  
15 as to cause the bicyclist/motorcyclist periods of time too sore to sit on seat and/or ride. It is not out of the realm of possibilities to project that, riding without addressing this soreness could be a safety concern caused by the mental distraction of soreness rather than concentrating on the direction of where and how you are riding.

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It is an aspect of the present invention to minimize soreness and or numbness/maximize comfort to provide the rider means of anatomical massage through intermittent or constant seat vibration/oscillation and/or massage while

the bike or motorcycle is in use. It is commonly understood and described in literature and accepted that vibratory/oscillation therapeutic massage soothes and or minimizes the anatomical soreness of muscles and surrounding massaged area. The present invention is the first therapeutic bicycle/motorcycle seat to minimize  
5 soreness at the perineum, ischial tuberosities and gluteus maximus muscles. Vascular circulation and or oxygenation maybe increased and node draining in muscles are optimized. Bodyweight placement on all prior art seats and saddles, occlude vascularization, oxygenation and muscle node drainage of toxins. Accumulation of toxins in muscles ultimately is the resulting physiologic event  
10 that causes muscle soreness and or numbness in any body muscle. Another common ailment is also a well documented (Irwin Goldstein, MD) problem with bicycle seats in particular that can lead to prostrate damage in males caused by seated weight placement on a bicycle seat over years of use.

15           A further aspect for motorcycle saddles in some models where the engine runs rough causing too much vibration at the frame and saddle may include an isolation, buffering or redirecting mechanism at the saddle basepan, in integration with the saddle so as non-wanted vibration is cancelled out electronically synchronized to the motorcycle engine's Rpm's. This now smoothly ridden  
20 saddle allows vibration to come through as programmed intermittently when desired, stimulating increased blood circulation/oxygenation node drainage thus minimizing soreness/numbness otherwise providing a more comfortable ride.

A further aspect for motorcycle saddles is using appropriate heating or cooling elements/means with current state of the art commonly available instruments using the engine and power from battery/generator.

5           A further aspect of the invention for bicycle seats is to provide Ni-Cad battery rechargeable means for the power source to allow massage over a three plus hour ride time between recharging. DC power socket will allow use with or without the cord. Solar power recharging and bike motion power recharging may be used to extend operation time. In the case of motorcycle seats the engines  
10   generator and subsequently the battery power allowing massage throughout the ride or when desired.

          Further aspects of the invention for bicycle saddles/seats is combining seat oscillation with a nodulized mechanism integrated at seat/seat post or is  
15   combining seat oscillation with integrated mechanical or electrical shock absorber within the seat/seat post.

          A further aspect for motorcycle and bicycles, is saddle integration of electrodes allowing conduction of electrical current via EMS electric muscle  
20   stimulation, already used in state of art pain management devices. This maybe an ideal alternative to oscillation or roller wheels for minimizing soreness/numbness and maximizing comfort.

For these and other reasons, a need exists for the present invention.

All US patents and patent applications, and all other published documents  
5 mentioned anywhere in this application are hereby incorporated by reference in  
their entirety.

### BRIEF SUMMARY

10 The present invention provides a seat apparatus and method which is  
practical, reliable, accurate and efficient, and which is believed to fulfil a need and  
to constitute an improvement over the background technology.

15 The present invention consists of a plastic or metal tube that  
vibrates/oscillates/massages upon activation and is integrated within the underside  
side carriage of presently designed bicycle and motorcycle seats described above.  
The tube is affixed so the seat and tube are one. Optionally to optimize massage as  
needed, it may be encased in a molded concave tube tunnel of the seat's plastic  
20 shell underside or in the case of motorcycle seats, channeling on integrated tracks  
or molded concave tube tunnels or tracks through the foam or gel adjacent to the  
seat covering material and seated rider running front to back. For bicycle seats, the  
vibratory/oscillating tube and or tube tunnel is approximately 7.5 inches long by

1.75 inches in diameter at it's widest and will weigh less than 1.5 lbs. The same approximate dimensions, varying as dictated on bicycle saddle type, apply to the tracks and tracking channels when roller wheel/ball functions are used on motorcycle seats and larger bicycle seats to minimize soreness and maximize  
5 comfort. Roller-wheels and tracks may weigh in the 1.5 to 10.0 lbs. or more.

For larger motorcycle seats, the oscillation tube/tube channels and or track(s) for rotation of roller- wheels/balls will run front to back for double seats (driver and passenger) ranging from 24 inches to 34 inches in length  
10 approximately dependent on motorcycle model. Typical seat widths for motorcycle saddles run 11 to 16 inches. Single or solo saddles run 19 to 22 inches in length with the same basic widths as doubles. Saddle length and widths primarily dictate if multiple oscillation tube/tube channels or rollerball track/track channels are required for optimal function.

15 The bicycle seat's power optionally is configured to allow vibratory/oscillatory tube recharging while tube is affixed to the seat on bike OR snapped in or out/locked in or out for recharging remotely or replacing all together when power source is diminished beyond the ability to be recharged. Motorcycles  
20 seat power comes form engine battery/generator.

Similar vibratory/oscillatory/rolling massage designed instruments and their dimensions include ultrasonic toothbrush for brushing teeth/massaging

gums and other retail and consumer plastic hand held vibrators/oscillation instruments for muscle massage approximately 7 inches long by 1.5 inches in diameter.

5           A primary advantage of present invention is anatomical soreness and or numbness is minimized while seated and riding the bicycle/motorcycle, causing soreness relief currently only by stopping to ride altogether, riding for shorter distance to minimize soreness or by standing to off-load seated body weight thus minimizing soreness and maximize comfort.

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          Another advantage of present invention is a seat sensor optional design to cause activation automatically providing pre-selected vibratory periods of massage as long as bicycle/motorcycle seat is seated upon. A “smart seat” starts massage requiring no thought process or manual on/off while riding for in the case  
15       of a bicycle the power is recharged as necessary. Digital and programmable controls or control bar activate and control all functions including seat sensor with automatic versions for both bicycles and motorcycles to massage, enabling the optimal comfortable ride.

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          The aspects, features, advantages, benefits and objects of the invention will become clear to those skilled in the art by reference to the following description, claims and drawings.



## BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWING

The present invention, and the manner and process of making and using it,  
5 will be better understood by those skilled in the art by reference to the following  
drawings.

FIG. 1 is a bottom view of bicycle seat and rod infrastructure with  
placement of vibratory/oscillatory tube, tube tunnel as part of or affixed to seat's  
10 plastic shell and rod contact as optimal for seat vibration/oscillation. Recharging  
connection and controls are viewed and overall approximate seat dimensions.

FIG. 2 is a side view of seat with rods and placement of tube also showing  
digital or rheostat control and in place recharging connection

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FIG. 3a. is rear view of integrated concave tube tunnel, oscillating tube in  
place with digital or rheostat control and rod infrastructure

FIG. 3b. is a blow up view of possible but not all-inclusive digital controls  
20 for selection of functions and or programs

FIG. 4a. is a bottom view front to back of tube design that will vary in dimensions as necessary to work with standard recreational bicycle seat, racing seat or anatomically correct seat and any other selected saddle types.

5           FIG. 4b. is a side view front to back of tube design calling out recharging connection and controls and approximate dimensions

FIG. 4c. is an rear-end view of oscillating tube, tube tunnel and controls with approximate dimensions

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FIG. 5 is a graphic of the seat, oscillating tube, controls and seat padding with sensor placement for vibration activation vis-a-vis body weight placement.

FIG. 6 is a bottom view of motorcycle seat: Roller wheel or ball and track  
15 as alternative or in addition to oscillation/vibration functions. Maybe integrated also with large recumbent bike seats and backs or other large bicycle comfort type seat configurations.

FIG. 7 is a side view of motorcycle seat: Roller wheel or ball and track  
20 alternative or addition. May be integrated also with recumbent bike seats and backs or other large comfort bicycle seat type configurations.

FIG. 8 is an end view of motorcycle seat: Digital Programmable Control Panel and Backrest with roller wheel or ball and track alternative or addition. Maybe integrated also with large recumbent bike seats and backs or other large comfort bicycle seat type configurations

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## DETAILED DESCRIPTION

The present invention is a electronically powered vibratory/oscillatory tube in the preferred embodiment affixed/integrated within a bicycle seat's undercarriage/plastic shell having intermittent contact points with metal rod seat infrastructure also part of the seat's undercarriage. **FIGS. 1-3a. /3b.** show the tube's integration in respective seat views of Bottom View **FIG. 1**, Side View **FIG. 2**, and Rear View **FIG. 3a. /3b.** The vibratory/oscillatory tube configuration Views are in **FIG. 4a/4b. /4c.** **FIG. 5** is a View of seat sensor placement within seats topside padding, allowing seat oscillation only when body weight is actually on seat. An alternative embodiment could just as easily have the tube as only part of the plastic underside seat shell and have no contact with the metal rod infrastructure. Yet another embodiment for larger bicycle saddles and or recumbent saddles and backs may have integrated roller-wheels and tracks as necessarily modified and described in more detail for motorcycle saddles seen in **FIGS. 6-8.**

In the present invention the seat's vibration/oscillation will be in a range of strokes per minute. Said range of strokes maybe as high as ultrasonic frequency 18,000 strokes per minute like that of electronic toothbrushes or as low as more traditional hand held vibratory instruments for muscle massage having 1,100 to 5,700 strokes per minute. Optimal node drainage and maximum comfort is approximately 2,800 RPM oscillation. The bicycle seat's underside tube tunnel and vibratory/oscillatory tube is approximating 7.5 inches long, 1.75 inches in diameter. The concave tube tunnel integrated in seat underside shell will mate up con-jointly with the vibratory/oscillatory tube made of a plastic or aluminum. At various points where necessary the tube tunnel and/or tube will contact the metal rod infrastructure as needed to optimize vibration/oscillation. Oscillating tube is snapped in or out or locked in/out of the tube tunnel.

The vibratory/oscillatory seat and tube containing the vibrating/oscillating components and rechargeable Ni-Cad battery, will have outside design varying in size, dimensions and configurations matching each of the most bicycle seat types; standard, gender specific, gel filled, spring supported, foam filled and racing seat configurations. For the standard recreational bicycle seat, in **FIG. 4a.4b. /4c.** having more oscillating tube detail, the tube size integrated into the seat on underside approximates 7.5 inches long by 1.75 inches in diameter and will weigh less than 1.5 pounds.

The seat vibratory/oscillatory activation is a simple digital on/off.

Alternatively a digital control or rheostatic control can be preset at the beginning

of a ride to “turn on” seat vibration/oscillation at pre-selected 15 or 30 minute

intervals for one-three minutes of controlled oscillation at a time lasting up to

5 three plus hour for rides between recharging and as long as body weight is on seat.

Three plus hours usage presumes a fully recharged battery.

In the preferred embodiment the on/off is digital control and

programmable controls and recharge connection are at the backside of seat under

10 the lowest lip of seat. See **FIG. 4a. /4b. /4c.** Rheostat or non-digital controls

alternatively may be used.

Full programmable control allows 1. Seat sensor/vibratory automatic

intermittent activation as discussed above via digital selection; 2. Multiple speed

15 selections done digitally allow more or less intense seat vibration/oscillation. ie.,

the higher number of strokes per minute equals greater vibration. For example,

5000 strokes per minute provides more vibration than 1500 strokes per minute.

Optimal vibration/oscillation will range from 1100 to 18000 strokes per minute: 3.

Wavelength of vibration may be selected digitally as “constant” providing the

20 same vibratory/oscillatory intensity stimulation throughout the activation period.

Oscillatory Rpm’s around 2800 are optimal for maximum physiological node

drainage and comfort. This increases oxygenation and blood flow to the sore

anatomical area where anatomical muscle/node drainage occurs. Due to body

weight on the seat is the nodes/nerves are occluded allowing muscle toxin build up, in all present bicycle seat no matter the seat configurations or materials. Or Rpm's of oscillation/amplitude and duty cycle control of the wavelength of oscillation may be digitally selected to Rhythmically go up and down in intensity during the activation period providing more soothing action to the muscles.

Therapeutic action of the muscles by controlling oscillation Rpm's/ amplitude or duty cycle control wavelength allowing intermittent bursts of oscillation for example every 2 seconds for a 1-2 minute period as long as being ridden is yet another possible function. All functions as described herewith are examples with ultimate or optimal functions having no real limitations but is dictated per bicycle seat type and anatomical needs are to provide minimization of soreness/numbness and maximization of comfort.

The primary recharging power supply for the vibratory/oscillatory tube part of the seat is the preferred embodiment and is a Ni-Cad battery, rechargeable electronically. The battery is within the seat tube itself. The tube also contains the vibratory/oscillatory mechanism for the seat. The tube can be snapped in/out of or locked in/locked out of seat's molded tunnel placement. As conceived recharging maybe performed with the tube in place when it is a part of the seat itself. Or recharging of the tube's power may be external or remote from the seat itself similar to recharging cell phones and or electronic toothbrushes. When recharging is part of the seat, see oscillating tube-recharging connection in **FIGS. 1 – 2**.

When oscillating tube is recharging remotely away from seat, the tube is placed

within an electronic recharging power carriage similar to a remote carriage used for recharging cell phones and toothbrushes. Or recharging can be performed when using a recharging unit as part of a cord similar to recharging laptop computer batteries. Tube may operate via a DC power connection with or without the cord. Such recharging sources are well known in the art, and therefore will not be described in detail herein. An alternative recharging power source embodiment maybe selected with the tube placed within the bike seat for recharging and not done remotely from the seat or vise-a-versa only recharging remotely and not when the tube is part of the seat.

**FIG. 6** Bottom View of Motorcycle Saddle The preferred embodiment of said roller-wheel/ball and track system would function front to back within tracks. Tracks may be molded of plastic, composite material or other suitable material to be optimally integrated within saddle. Alternatively a circularly or any other layout of wheels/balls on underside of seat to provide optimal massage and comfort with state of art motors to drive wheel function. Housing for motors may cover multiple sets of tracks to afford optimal state of art motors. Digitally controlled and programmed functions may be kneading, rolling, percussion or compression as standard replicating massage actions. For large bicycle saddles such as recumbent bike saddles and large bicycle comfort saddle types, the roller wheel and tracking may be optimal alternative for comfort. Whereas, power source will be rechargeable ni-cad for bicycles and basically the same as for vibration and oscillation functions, the power source for a motorcycle, is engine's

battery/generator. The same embodiments with dimensional differences for vibration/oscillation saddle actions/functions may interchangeably be integrated in smooth riding or other motorcycle saddles when desired. Still another embodiment shows the footprints of buffering or isolation mechanisms at the basepan of motorcycle saddles that are electronically controlled and synchronized to the engines Rpm's. This buffering mechanism cancels out too much vibration at the seat level originating from the engine and frame frequently found on rough riding motorcycles like some Harley's. The buffering can intermittently allow vibration/oscillation to come through to the otherwise smooth riding controlled seat to maximize comfort, minimize soreness and numbness just as vibratory/oscillatory functions found on bicycle saddles in **Figures 1-5**. All above may also apply to backrests on motorcycles. Actual saddle dimensions and configurations are dictated by the frame of various brands and models of motorcycles

**FIG. 7** Side View of Motorcycle Saddle. All in the Bottom View narrative above applies to Side View. The preferred embodiment has the wheels tracking through the foam standardized for most motorcycle seats as seen in side view. In this view the footprints of the isolation and/or buffering mechanisms synchronized to the engine to cancel out vibration are clearly displayed. The cancellation mode will optionally only be incorporated in selected rough riding motorcycles. Base pans are common to all motorcycles as the platform interface for the saddle configured to the motorcycles frame and shape. Above also applies



to backrests and actual dimensions and configurations are dictated by the frame of various brands and models of motorcycles.

**FIG. 8** Rear End View Motorcycle Saddle All narrative above in the **FIG.**  
5 **6** Bottom and **FIG. 7** Side View applies to the End View. The preferred  
embodiment has Programmable Digital Control Panel located at the back and end  
of the saddle as pictured. Or another embodiment has the controls as a part of  
motorcycle's standard instrument display panel. Functions may run all the time or  
only intermittently at set times for set duration programs or only when selected to  
10 be operational ie. "turned on." Functional controls may include: "On/Off;  
Oscillation Mode of One speed optimized at 2800 Rpm's, Therapeutic or  
Rhythmic etc., Wheel Mode of Roll, Knead, Percussion or Compression; and  
Isolation Mode Program or other. Selected or optimal functions need to be  
determined at prototype testing and development but all of the above may be  
15 included.

The descriptions above and the accompanying drawings should be  
interpreted in the illustrative and not the limited sense. While the invention has  
been disclosed in connection with an embodiment or embodiments thereof, it  
20 should be understood by those skilled in the art that there may be other  
embodiments which fall within the scope of the invention as defined by the  
claims. Where a claim, if any, is expressed as a means or step for performing a  
specified function it is intended that such claim be construed to cover the

corresponding structure, material, or acts described in the specification and equivalents thereof, including both structural equivalents and equivalent structures, material-based equivalents and equivalent materials, and act-based equivalents and equivalent acts.